



Sharpening the Spear Through Innovative Acquisition

The F-5 Adversary Program

Jay Bolles ■ William Broadus ■ William F. Conroy III ■ Lt. Cmdr. Jason Goff, USN ■ Mike Ingalls ■ Mike Kotzian ■ Duane Mallicoat ■ Capt. James Wallace, USN

Today's naval aviators feel confident their tactics and training were instrumental in accomplishing the successful missions conducted during Operation Enduring Freedom and Operation Iraqi Freedom. In typical fashion, lessons learned will be documented and studied, then applied toward the development of new tactics and training procedures. Key to the development of lessons learned will be the Adversary Program that prepares Navy and Marine Corps pilots for the combat environment of the future. Air combat expertise that was vital to yesterday's operations will not necessarily be effective in tomorrow's conflicts. As one means to ensure naval aviators remain ahead of the curve in terms of air combat expertise, the Adversary Program provides fleet fighter pilots with real-world airborne engagements that replicate validated threat tactics in the most credible manner possible. For that reason, the Adversary Program must use the best representative equipment available in the most realistic environment possible to ensure U.S. aviators continue to excel at their missions.

Bolles is the Adversary Program integrated product team lead for PMA 207. **Broadus** is a DAU professor of systems engineering and acquisition management. **Conroy** is a DAU professor of life cycle logistics and production, quality, and manufacturing. **Goff** is the Adversary Program deputy program manager for PMA 207. **Ingalls** is a program manager for Northrop Grumman. **Kotzian** is a DAU professor of acquisition management. **Mallicoat** is a DAU professor of life cycle logistics and acquisition management. **Wallace** is the program manager for PMA 207.

"A common adage within the strike/fighter community is 'you're only as good as you train.' The Navy and Marine Corps' Adversary Program directly enables that training at multiple levels through cost-effective, realistic, and tailored adversary support designed to accurately mimic potential future adversaries," said Lt. Cmdr. Mark Sucato, an Adversary Program requirements officer.

A Requirement to Change

The F-5 aircraft serves as the primary Adversary Program platform for the U.S. Navy and the Marine Corps. The aircraft is a single-seat, twin-engine, tactical fighter/attack platform. Using a design that emphasizes high maneuverability rather than high speed, the F-5 is ideally suited as an adversarial air-to-air threat that replicates other foreign military capabilities.

Currently, there are two Navy adversary squadrons that maintain and operate F-5 aircraft: the VFC-13 "Fighting Saints" at Naval Air Station Fallon, Nev., and the VFC-111 "Sundowners" at Naval Air Station Key West, Fla. A third squadron operated by the Marine Corps is the VMFT-401 "Snipers," and it is located at Marine Corps Air Station Yuma, Ariz. The squadrons' mission is to engage Navy and Marine Corps aircraft in a training environment to enhance blue force (U.S. and allied forces) pilots' aerial combat proficiency. The F-5s serve as simulated red forces (adversary forces).

In January 2002, the importance of the F-5 Adversary Program was highlighted by an Office of the Chief of Naval Operations (OPNAV) requirement that F-5 aircraft remain in service until at least fiscal year 2015. While that might have seemed like welcome news to the Adversary Program, existing data proved that such a requirement would be difficult to achieve. A Naval Air Systems Command February 2001 fatigue life study of existing F-5s concluded that the airframe's fatigue life values expended had increased approximately 39 percent higher than originally anticipated—to an average of 79 percent per aircraft. That percentage was expected to continue to rise at an annual rate of 3 to 5 percent per aircraft. The bottom line was that the Adversary Program's F-5 fleet expected to show an increased rate of structural repairs in order to meet the OPNAV requirement. The Adversary Program had a structural repair program in place to provide estimated repairs and investments to maintain the F-5's estimated operational tempo; however, there were insufficient structural repair program funds to keep the F-5 fleet operational through 2015 after factoring in the 2001 fatigue life study.

Without a substantial increase in the structural repair program budget, 73 percent of the existing F-5 aircraft were expected to drop out of service by fiscal year 2007. The question became how could the F-5 Adversary Program meet its training mission goals in accordance with the OPNAV requirement while faced with insufficient structural repair program funds and fatigued aircraft?

An Out-of-the-Box Acquisition Approach

To solve the Adversary Program's problem, the first option considered was modification of the current F-5 fleet, and that option was a non-starter due to a lack of structural repair program funds. The second option was to acquire new F-5 aircraft and perform one-for-one swapouts with existing airframes. However, the F-5 aircraft production line had been closed for more than 10 years, and any production restart—if at all possible—would not field equipment in time to meet the OPNAV requirement.

Undeterred, the Adversary Program continued to broaden its search and found an innovative solution: reverse foreign military sales (FMS).

Buying Aircraft Back

In the late 1980s, Switzerland procured more than 70 F-5 aircraft via a U.S. Air Force FMS case. A restructuring of the Swiss Armed Forces made some of their F-5 aircraft expendable. Using an out-of-the-box acquisition approach, the F-5 Adversary Program considered the possibility of buying back some of the Swiss F-5 aircraft. The attraction was that the Swiss F-5s were low-time aircraft (2,500 flight hours per aircraft) compared to the high-time aircraft (7,000 flight hours per aircraft) currently being flown by the U.S. Navy and Marine Corps adversary squadrons.

"The Swiss aircraft had very few flight hours and were in great shape, so it was an attractive option from the beginning," said Lt. Cmdr. Jason Goff, the Adversary Program deputy program manager within Naval Air Systems Command, PMA 207 (Support and Commercial Derivative Aircraft) and contributor to this article.

The F-5 Adversary Program team members immediately recognized the benefits of such an innovative acquisition approach, but they needed to quickly assess whether the solution was defensible. After all, time was of the essence because Switzerland planned to entertain the first acceptable purchase proposal regardless of who the potential buyer might be.

Assessing Against the PM's Scorecard

Any program manager's scorecard is graded first and foremost on three criteria: performance, cost, and schedule; and the F-5 Adversary Program team reviewed all criteria when assessing whether the reverse FMS approach was feasible.

Performance

Procuring the Swiss F-5 aircraft would result in a more capable platform that would challenge U.S. Navy and Marine Corps pilots. Performance enhancements integrated from the Swiss aircraft would include an improved inertial navigation system, new radar warning receiver

capability and chaff/flare capability, added anti-skid capability, improved airborne radar capability, and standardized cockpit configuration.

The approach would also avoid costly landing gear and engine investments that the F-5 Adversary Program needed to address if its current aircraft were to continue to be used, as the landing gear and the engines would need to be replaced in time. In addition, using the low-flying-time Swiss aircraft would avoid the costly “on condition” (i.e., as required) replacement of some of the current F-5 aircraft’s dorsal longeron (the beam that runs along the top length of the aircraft providing airframe structural support) required as a result of fatigue issues.

When viewing those advantages from a systems-of-systems perspective, the F-5 Adversary Program made the early observation that using the Swiss aircraft as one-for-one replacement aircraft—augmented with select components from the current U.S. F-5 Adversary airframes—would be the most cost-effective approach.

To best ensure that the challenges associated with realizing those performance enhancements were identified and effec-

tively resolved, the F-5 Adversary Program relied heavily on an integrated product team (IPT) approach. That organizational structure paid huge dividends during the Swiss reverse FMS initial deliberations because the prime contractor for F-5 maintenance—Northrop Grumman—was involved in all discussions from inception. Therefore, when the Adversary Program began to recognize the benefits associated with using low-time Swiss F-5 aircraft, the Northrop Grumman team was able to assist in selecting the best components to cross-deck from existing U.S. F-5 aircraft into the Swiss F-5 aircraft. Northrop Grumman also understood the scope of work involved for each conversion—including life cycle logistics and government manual/drawing updates.

In addition, Northrop Grumman was able to prepare its depot maintenance facility in St. Augustine, Fla., in advance to hit the ground running when the first Swiss aircraft arrived in 2003 as well as develop specialized dollies for uploading/downloading disassembled aircraft for C-130T aircraft transport.

According to Mike Ingalls, Northrop Grumman’s F-5 program manager and a contributor to this article, “Being treated as an equal partner and having our expertise proactively sought from the very beginning made all the difference in being able to meet the program’s aggressive schedule.”

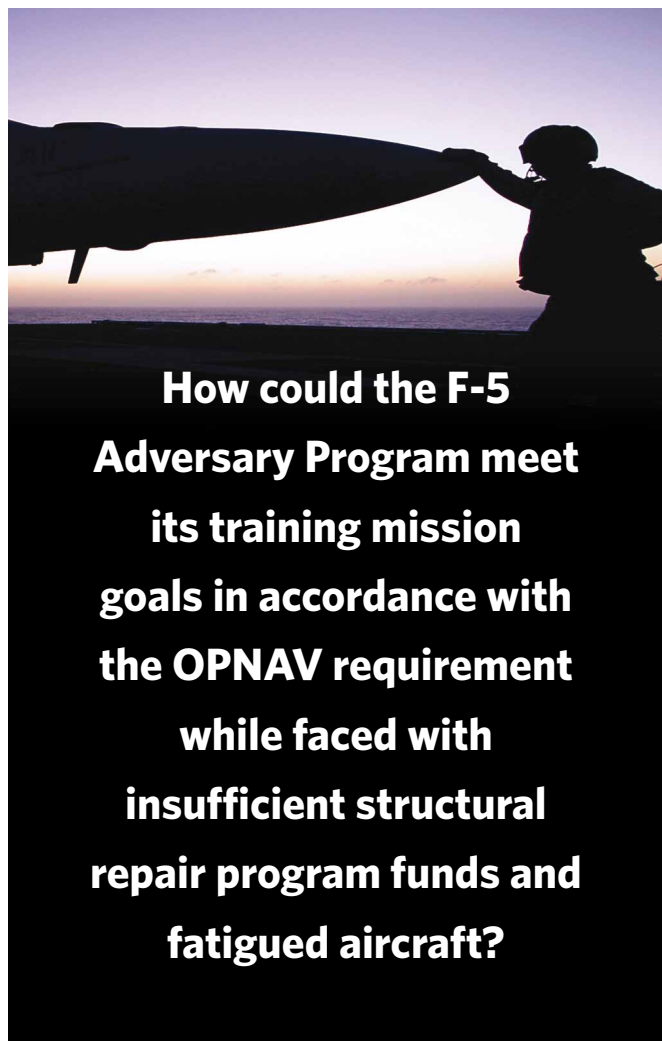
The new “replacement” aircraft was designated the F-5N to differentiate it from the existing U.S. Navy/Marine Corps F-5 fleet, which were designated F-5E.

Cost

As with most “restructured” programs, cost quickly becomes a major topic. As it turns out, the cost of using Swiss F-5 aircraft actually turned out to be one of the reverse FMS initiative’s biggest selling points. As you might guess, it was not a straightforward solution and required the F-5 Adversary Program team to once again display its ability to embrace acquisition innovation.

The main problem was that the purchase initiative required procurement funds, and the F-5 Adversary Program had very little funding because the production line had long since shut down. Most of the existing budgeted program funds were in the structural repair program’s Operational Safety Improvement Program, intended for modification and maintenance of the existing U.S. F-5 fleet. However, the Adversary Program realized that using the Swiss F-5 aircraft eliminated most of the budgeted structural modification kit requirements. Knowing that, the F-5 Adversary Program took actions to successfully reprogram the now-available funds for an initial buy of 15 Swiss aircraft.

In addition, the Adversary Program recognized that the reverse FMS purchase would decrease modification and repair costs in the out-years, to include the procurement of components necessary to keep the existing F-5 fleet operational.



**How could the F-5
Adversary Program meet
its training mission
goals in accordance with
the OPNAV requirement
while faced with
insufficient structural
repair program funds and
fatigued aircraft?**

By using the Swiss aircraft as replacements, an additional realignment of budgeted out-year funds enabled the purchase of an additional 17 Swiss F-5 aircraft.

It does bear mentioning that one of the most important tenets of today's acquisition process was not forgotten: life cycle logistics support. For virtually cents on the dollar, the F-5 Adversary Program team negotiated the inclusion of critical spares and ground support equipment to ease the logistics burden of introducing Swiss F-5 aircraft into the U.S. Navy/Marine Corps inventory.

In addition, the Navy negotiated a firm fixed-price contract to minimize risks. Using that particular contract vehicle placed the entire burden upon the Swiss once negotiations were concluded and the contract was formally signed.

Upon completion of negotiations with Switzerland, a final agreement was reached for the Navy to procure a total of 32 Swiss F-5 aircraft. Most important, the ability to identify a reprogramming path forward allowed the F-5 Adversary Program to accomplish the entire reverse FMS initiative—32 aircraft with associated spares and ground support equipment—within the program's \$43 million budget, and no additional Navy funding was required.

As a final testament to the cost savings realized with the Swiss initiative, the Navy Reserve allocated funding in fiscal year 2004 and 2005 to procure 12 additional F-5 aircraft. Once converted to the F-5N configuration, the aircraft enabled the F-5 Adversary Program to establish the previously mentioned (and newest) F-5 Adversary base of operations—Naval Air Station Key West. Thus, a total of 44 Swiss F-5 aircraft quickly became the revitalized backbone of the U.S. Navy/Marine Corps Adversary squadrons.

Schedule

As previously mentioned, the F-5 Adversary Program was under intense time pressure to reach an agreement with the government of Switzerland. In addition to the concern of other governments procuring the available Swiss aircraft, the F-5 Adversary Program team also had to worry about how the timing of reprogrammed/realigned funding actions affected the program's schedule.

Unless necessary approvals were obtained by early 2003, the Adversary Program would have to obligate \$15 million of maintenance and spare parts funds in order to keep the existing U.S. Navy/Marine Corps F-5 fleet operational. Having to obligate those funds would decrease the funds available to procure Swiss aircraft, which would delay the Swiss procurement by one year. There were simply not enough funds to both continue maintenance/spare parts efforts for the existing U.S. F-5 fleet and concurrently designate program funds to procure Swiss aircraft. It would need to be one or the other, but not both.

Eventually the F-5 Adversary Program was able to gain the necessary approvals required—including congressional—to proceed with the Swiss F-5 procurement initiative by supporting numerous acquisition strategy and program review meetings and discussions with senior-level officials both internal and external to DoD. The approvals were, for the most part, all gained within a 12-month period. The efforts expended by the F-5 Adversary Program to gain the approvals again pointed to the importance of the IPT organizational structure. Without such an organizational approach, the F-5 Adversary Program would have had to scramble in order to ensure all affected stakeholders agreed with the proposed acquisition approach. However, with the Adversary Program relying upon a healthy IPT organizational structure from program inception, there was the assurance that all major stakeholders were well aware of the goals and benefits afforded by changing the program's path to a Swiss aircraft procurement approach.

Gaining the necessary approvals meant the F-5 Adversary Program was able to structure a program that would ensure a successful accomplishment of the OPNAV goals—maintaining F-5 Adversary mission support for training and tactics development without any degradation through the 2015 timeframe. With those approvals, the converted Swiss F-5 aircraft acquisition initiative was given an acquisition category (ACAT) IVM designator, which signifies that formal developmental or operational testing was not required.

The previous paragraphs cannot possibly provide the full perspective of challenges the F-5 Adversary Program faced in order to structure a program that met all performance, cost, and schedule requirements. As observed by Capt. James Wallace, PMA 207's program manager and contributor to this article, "Even though we had a superb working relationship with the Swiss government and Northrop Grumman, it did not automatically translate to smooth sailing. The program's timelines, cost constraints, various stakeholders, and numerous other issues made it necessary for us to constantly maintain situational awareness in order to keep things on track."

The Need for Flexibility

In addition to managing performance, cost, and schedule, any successful acquisition program needs to remain flexible in order to handle the inevitable changes and challenges. In that regard, the F-5 Adversary Program was highly successful on a number of fronts.

Congress

The nature of the reverse FMS approach necessitated congressional approvals before the first Swiss F-5 aircraft could be picked up by a C-130T transport aircraft. The short timelines available for a congressional approval needed to be coordinated among four major committees: the House and Senate committees on armed services, and



DoD program managers need to truly think out of the box, not only as stewards of the taxpayer's dollars but, more important, for those putting their lives on the line at the sharp end of the spear.

ally the last minute. In fact, U.S. Navy personnel were actually in Switzerland when that occurred.

Those four examples are just a sampling of the challenges faced by the F-5 Adversary Program across the entire initiative, spanning more than six years. But the F-5 Adversary Program is not unique—just about any acquisition program in today's environment will face its own set of unique and challenging obstacles that can only be overcome with an inherent ability to remain flexible.

Success from Innovation

From all accounts, the F-5 reverse FMS initiative is a success story. It's not often that a program office contemplates going to a foreign government in order to buy back something as complex as an F-5 aircraft to meet a critical mission support capability—and succeeds! In fact, the program was so successful that Jay Bolles, PMA 207's IPT lead for the F-5 Adversary Program and contributor to this article, said, "We are forecasting to have at least 80 percent of the aircraft last past 2020."

As someone very familiar with the importance of the F-5 Adversary Program, Vice Adm. Thomas Kilcline, commander, Naval Air Forces; and commander, Naval Air Force, U.S. Pacific Fleet, said, "The F-5 will remain crucial to our adversary forces in both quantity and capability for the foreseeable future. Buying back these F-5s from Switzerland is a great example of innovative

the House and Senate subcommittees on defense appropriations.

Department of State

The Department of State needed to provide third party transfer certification approval for any foreign country wanting to retransfer defense articles back to the United States that were originally provided under an FMS case.

Delivery of Initial Aircraft

Just when everything was falling into place for a USN C-130T pickup of the first aircraft in Switzerland, higher-priority mission requirements associated with the Global War on Terrorism prevented the C-130T from meeting the initial delivery date of Swiss F-5 aircraft to the Northrop Grumman facility.

Government Approvals

Internal debates within the government of Switzerland over whether to provide final government approval arose at liter-

thinking on the part of our acquisition partners. ... The Adversary Program is one of our vital training assets—an asset all of our air wings train against prior to deployment. Our red adversary force helps ensure our naval aviators will continue to be the best-prepared aerial warfighters in the world."

There is a need to advocate innovation throughout DoD's programs. It needs to be more than talking points by those merely parroting current acquisition policies. DoD program managers need to truly think out of the box, not only as stewards of the taxpayer's dollars but, more important, for those putting their lives on the line at the sharp end of the spear.

The authors welcome comments and questions and can be contacted at jay.bolles@navy.mil, william.broadus@dau.mil, william.conroy@dau.mil, jason.g.goff@navy.mil, mike.ingalls@ngc.com, mike.kotzian@dau.mil, duane.mallicoat@dau.mil, and james.wallace@navy.mil.